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WEATHERBY, ELLSWORTH	
ART UNIT	PAPER NUMBER
3768	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,118	AKIYAMA ET AL.	
	Examiner	Art Unit	
	ELLSWORTH WEATHERBY	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *Foreign Prior Art: Horiuchi JP 2000206229, Yamamoto GB 221660*.

DETAILED ACTION

Claim Objections

1. Claims 1 is objected to because of the following informalities: Regarding the claim 1 limitation, "…with respect to each count value obtained by counting pulses from the rotary encoder," the antecedent basis is unclear. This limitation is interpreted to read, "…with respect to each of a plurality of count values, wherein the count values are obtained by counting pulses…". Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claims 1-6, Language that suggests or makes optional but does not require steps to be performed or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation. The following are specific examples of this type of optional claim language occurring in, for example, claim 1. The claim 1 limitation, an ultrasonic transducer *that scans an ultrasonic beam,* is unclear because of the recitation *that scans an ultrasonic beam*. This is an example of claim language that makes optional the functional limitation. For the purposes of examination, the limitation *that scans an ultrasonic beam* is interpreted to read,

configured to scan an ultrasonic beam. This also applies to the claim 1 limitation "…*that allows* the ultrasonic transducer to perform swing scanning in a direction crossing a scanning direction of the ultrasonic beam". This also applies to the claim 1 limitation "…*that generates* a pulse according to a rotational position of the transducer swinging-motor". This also applies to the claim 1 limitation, "…*that stores* previously measured swing scanning angle…". This type of optional functional language recitation occurs *mutatis mutandis* throughout claims 2-6. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Utenick (USPN 4,429,262) in view of Horiuchi (JP2000206229: translation is provided).

6. Utenick teaches a rotary controlled ultrasonic probe (abstract; fig. 1-3). Utenick goes on, teaching a diagnostic ultrasonic transducer that scans an ultrasonic beam (col. 1, ll. 6-40; col. 2, ll. 29-33); a transducer-swinging motor that allows the ultrasonic transducer to perform swing scanning in a direction crossing a scanning direction of the ultrasonic beam (col. 2, ll. 29-57); a rotary encoder that generates a pulse according to a rotation position of the transducer swinging motor (col. 3, ll. 23-44; col. 7, ll. 21-67); and an encoder correction ROM (1143) that stores scanning angles with respect to

each count value obtained by counting pulses from the encoder, and outputs the measured and stored scanning angle of the ultrasonic transducer (abstract; col. 2, ll. 15-57; col. 3, l. 23- col. 4, l. 24). Utenick also teaches that the encoder correction ROM stores swing directional angles that are different between a forward path of swing scanning and a return path of the swing scanning (col. 4, ll. 15-24 & 60-66; col. 5, l. 33- col. 6, l. 55).

7. Utenick does not expressly teach that the rotary encoder stores a previously measured swing scanning angle of the ultrasonic transducer with respect to each of a plurality of values obtained from the rotary encoder, and outputs previously measured and stored swing scanning angle of the ultrasonic transducer.

8. In a related field of endeavor, Horiuchi teaches an ultrasonic device controlled by a bi-directional rotary encoder (Figs. 1-3, ref. 12), comprising: an ultrasonic transducer that scans an ultrasonic beam (ref. 12); a transducer-swinging motor that that allows the ultrasonic transducer to perform swing scanning in a direction crossing a scanning direction of the ultrasonic beam (0022; ref. 24); a rotary encoder that stores a previously measured swing scanning angle of the ultrasonic transducer with respect to each a voltage value obtained by reading pulses from the rotary encoder (0008; 0027; 0030-0031), and outputs previously measured and stored swing scanning angle of the ultrasonic transducer (abstract; 0038). Horiuchi also teaches storing measurements where the ROM stores swing directional angles that are different between a forward path of swing scanning and a return path of swing scanning (0018-0021).

9. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the rotary encoder of Utenick with the rotary encoder that stores a previously measured swing scanning angle of Horiuchi. The motivation to modify Utenick in view of Horiuchi would have been to correctly calculate the position of the transducer as it moves, as taught by Horiuchi (0008).

10. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (GB 2 216 660 A) in view of Pini (USPN 5,159,931) and Horiuchi (JP2000206229: translation is provided).

11. Yamamoto et al '660 (hereinafter Yamamoto) teaches an ultrasonic probe, comprising: an ultrasonic transducer that scans an ultrasonic beam (Fig. 1, ref. 11); a transducer-swinging motor that allows the ultrasonic transducer to perform swing scanning in a direction crossing a scanning direction of the ultrasonic beam (Fig. 1, refs. 12-13); a rotary encoder that generates a pulse according to a rotational position of the transducer-swinging motor (pg. 4-5, Detailed Description, par. 1-2; Fig. 1, ref. 14); and an encoder correction device that stores an actual swing scanning angle of the ultrasonic transducer and outputs the stored actual swing scanning angle of the ultrasonic transducer (pg. 5, par. 3-4; pg. 7, par. 1-3). Yamamoto also teaches that the correction device stores swing directional angles that are different between a forward path of swing scanning and a return path of the swing scanning (pg. 6, par. 1; Fig. 2A-B).

12. Yamamoto et al. '660 teaches using a digital switch that can be used as a correcting signal to an output signal of the encoder (pg. 8, par. 2). However, Yamamoto does not expressly teach a counter that counts the outputs from the rotary encoder. Yamamoto also does not expressly teach a transmitting/receiving means that excites the vibrators of the ultrasonic transducer. Yamamoto also does not expressly teach an encoder correction ROM that stores a previously measured swing scanning angle of the ultrasonic transducer with respect to each count value. Yamamoto also does not expressly teach a three-dimensional image processing means that forms a three-dimensional image.

13. In the same field of endeavor, Pini '931 (hereinafter) Pini teaches a counter that controls a counter for sartorial scanning and a counter for rotation control which are combined for controlling the stepper motor driver (col. 8, ll. 40-58). Pini also teaches a transmitting/receiving means that excites the vibrators of the ultrasonic transducer (col. 9, ll. 12-17). Pini also teaches a three dimensional image processing means that produces a three-dimensional image for display (abstract; col. 8, ll. 33-39; col. 13, ll. 33-36; claim 1).

14. Pini '931 does not expressly teach that the rotary encoder stores a previously measured swing scanning angle of the ultrasonic transducer with respect to each of a plurality of values obtained from the rotary encoder, and outputs previously measured and stored swing scanning angle of the ultrasonic transducer.

15. In a related field of endeavor, Horiuchi teaches an ultrasonic device controlled by a bi-directional rotary encoder (Figs. 1-3, ref. 12), comprising: an ultrasonic transducer

that scans an ultrasonic beam (ref. 12); a transducer-swinging motor that that allows the ultrasonic transducer to perform swing scanning in a direction crossing a scanning direction of the ultrasonic beam (0022; ref. 24); a rotary encoder that stores a previously measured swing scanning angle of the ultrasonic transducer with respect to each a voltage value obtained by reading pulses from the rotary encoder (0008; 0027; 0030-0031), and outputs previously measured and stored swing scanning angle of the ultrasonic transducer (abstract; 0038). Horiuchi also teaches storing measurements where the ROM stores swing directional angles that are different between a forward path of swing scanning and a return path of swing scanning (0018-0021).

16. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the rotary ultrasonic probe of Yamamoto in view of the encoding of sector scans for diagnostic processing of Pini and the encoding correction of Horiuchi. The motivation to modify Yamamoto in view of Pini and Horiuchi would have been to provide accurate rotary motor control for 3D sector scans.

Response to Arguments

17. Applicant's arguments, filed 7/22/2009, with respect to the rejection(s) of claim(s) 1-6 under Utenick '262 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Horiuchi '229. Specifically, Horiuchi '229 teaches the storage of previously measured swing scanning angles with respect to values determined from the rotary encoder

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELLSWORTH WEATHERBY whose telephone number is (571) 272-2248. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EW/

/Long V Le/
Supervisory Patent Examiner, Art Unit 3768